

SIXPENCE

JANUARY 1942

AMATEUR RADIO

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AMATEUR RADIO

No. 12

January, 1942.

AUTOMATIC DIRECTION FINDING

- From an article by Ralph Gibbons in QST -

A device called the radio compass was introduced to air navigation in about 1932. The principle of this device briefly is as follows:- If both a loop antenna and a vertical (non-directional) antenna are connected to a receiver through suitable coupling networks, the resulting field pattern is a cardioid (fig. 1a).

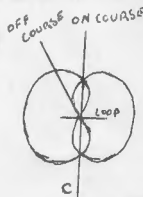


A



B

Fig 1.



C

If the connections to the loop are reversed, the pattern will be as in fig. 1B. i.e. the maximum signal will now come in along the line that previously gave minimum response.

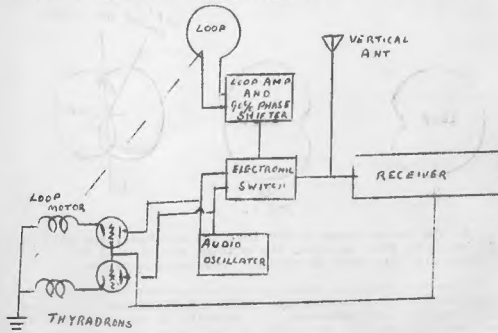
The radio compass consisted of a receiver to which was connected a zero-center output meter and electronic switching for simultaneously reversing the polarity of the meter and of the loop antenna. If the radio station were located directly ahead, reversing the loop connections would not increase or decrease the amount of receiver output and hence the needle

would not deflect (fig. 1C). If, however, the station were located to right or left, the pickup would be greater with one loop connection than the other and the needle would deflect in the corresponding direction. This device would let a pilot know if he was headed for the station but could not fix his position.

A few years ago someone conceived the idea of adding electrical contacts (in effect) to either side of the loop movement, those contacts in turn to close the circuits of an electric motor that would rotate the loop. The position of the loop could then be indicated on an azimuth scale. Thus, if the station is to the right or left of the plane, when the signal is tuned in the loop will rotate until the meter is returned to zero, and the position of the loop gives the bearing of the radio station from the plane.

This device as contrasted with the radio compass is extremely useful to the pilot. By tuning in two stations he can obtain crossed bearings and so fix his position. A better picture of the system can be obtained by referring to Fig. 2.

Essentially it consists of a loop antenna, a loop amplifier and 90° phase shifter, an electronic switch, a non-directional antenna, a sensitive and selective receiver, a thyatron azimuth control circuit and an audio oscillator.



The voltage induced in the loop is maximum when the plane of the loop is turned towards the transmitter and is zero when perpendicular to the line from the transmitter. The resultant of the voltage induced in the loop is 90° and of phase with that induced in the vertical antenna and changes abruptly 180° as the loop is rotated through the position of zero pickup. The voltage from the loop is amplified and shifted through 90° so that it is either in phase with, or in phase opposition to, the voltage induced in the vertical antenna, depending upon which edge of the loop is turned towards the transmitter.

The voltage from the loop amplifier is then fed into the electronic switch stage. The circuit is somewhat similar to a push-pull amplifier stage, where two tubes are connected in push-pull with an additional coupling in the common grid return. The output of the loop amplifier is fed into this common grid circuit and the output from an audio oscillator is fed to the grids in push-pull. The result is that depending on the polarity of the voltage from the audio oscillator, one tube amplifies during part of half of the audio cycle and the other tube during part of the other half of the audio cycle. The plates of the two tubes are connected in push-pull through a tuned circuit, and because of the switching action between the two tubes, the phase of the current in this circuit will reverse in accordance with the audio oscillator.

From the electronic switch stage the loop signal is combined with that from the vertical antenna and amplified and directed in a regular receiver circuit. The output signal from the receiver is impressed in parallel on the grids of the two thyatron tubes used to control the loop motor. The plates of the thyatrons are fed in push-pull by the audio oscillator, and, depending upon which way the loop is turned, the phase relation determines which of the thyatrons will fire and thus which way the loop will turn. When the loop is broadside to the direction of the radio station, the difference or resultant is zero and the motor does not operate. The circuits are arranged so that if the signal is coming from the left, the modulation is such that the indicator points to the left and if the signal is from the right, the pointer turns in that direction.

The accuracy of the signal is excellent under normal conditions, but there are several factors influencing its accuracy under adverse conditions. Static has little or no effect except to cause a spurt of a few degrees in one direction or the other but heat lightning, because of its more continuous nature, offers a greater problem. During intense conditions the pointer may tend to swing away from the station and towards the direction of the center of the thermal static agitation under such conditions

automatic operation is usually limited to 40 or 50 miles. Trouble is also experienced in mountainous regions where reflections of the signal take place.

However, the ADF idea has opened new fields in commercial aviation. A new indicator has been released which combines two ADF's that can be tuned to two separate stations within its range. The bearings thus obtained are indicated in a single dial scale through the medium of red and green needles concentrically projecting across the scale face. In operation it is possible to tune in a station ahead of the plane on one direction finder and a station aft of the plane on the second unit, with the bearings indicated by the two colored needles. Thus in flying a straight route between two stations not served directly by radio range courses the plane's position is indicated by the two needles which, with the plane on course, will be separated by 180°. Should the plane deviate from a straight line between the two stations, this fact is immediately and continuously shown by the tendency of the two needles to turn towards each other.

MEMORIES OF THE PAST

- Some Early Signals With England -

Some of the gang were seated in Air Force House, and of course the conversation gradually drifted around towards Contests and many anecdotes were flying round. In the good old days - that is, before Adolf, this was the time of the year when the xmtr and rx were being tuned for the B.E.R.U., due regard being paid to that Rule that said that the Licensed Power must not be exceeded - well not much anyway. Memories of the manner in which ZC6EC pounded through about 2 p.m., ST6KR in the wee sma hours and the seeming inability of E19J. to hear anyone in the Contest whom he had worked a few days previously and given R8 reports to and the mad scramble to work XZ2DY, brought happy memories and a longing to call TEST BERU once again.

A remark made by one bright spark to the effect that in one Contest he sent "TEST BERU" no "G's" pse "brought many a smile and turned my Memory back to the days when a "G" signal, much less a qso was something that every ham dreamed of and herewith an extract from the "Sydney Morning Herald" of 26/11/24.

"Wireless Amateurs Feat - Messages to England"

"At 4.15 o'clock yesterday morning Mr. Charles MacLurcan of Strathfield and Jack Davis of Vaucluse, well-known wireless amateurs exchanged clear messages in morse code with E.J. Simmonds 20D of Gerards Cross Buckinghamshire England.

They are the first two wireless amateurs in New South Wales to exchange messages with England.

Mr. Maclurcan as President of the Wireless Institute seized the opportunity to send a message to the King. The messages by wireless ran "To His Majesty the King. Greetings from Australian Radio Experimenters. Signed - Maclurcan, President, Wireless Institute."

Last night Mr. Maclurcan achieved another notable triumph. He was able to communicate with an American Amateur 6CGO on his low power set using a power of not more than ten watts. He sent a code word of four letters which was correctly received by the American Amateur and checked back. This was reception was verified by 2DF and a New Zealand Amateur Mr. Bell 4AA.

It was Mr. Davis 2DF who first picked up the English Amateur yesterday morning. He successfully exchanged messages with Mr. Simmonds until 4.50 a.m. Mr. Davis was working his own home-made set with a power of 100 watts. Later Mr. Maclurcan using 250 watts also got into touch with England and was equally successful.

It is not however an Australian record, as a Victorian Amateur was able to communicate with Mr. Simmonds last week.

In their exchanges with England yesterday morning Mr. Maclurcan and Mr. Davis each worked on a wavelength of 86 metres. Mr. Simmonds operated on a wavelength of 96 metres.

Messages were not only received on two valve sets, but at times they were in clear communication with England on one valve."

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"LONDON CONFIRMATION"

London,
November 25th.

Mr. Simmonds of Gerrards Cross, a village in Buckinghamshire has received by wireless a message of greeting to King George by Australian Experimenters. This was transmitted by Mr. Chas. Maclurcan of Strathfield, Sydney and was forwarded to His Majesty by Mr. Simmonds.

"T. High."

... SLOUGH HATS & FORAGE CAPS ...

Well, chaps the news this month isn't so good. Can any of you give me some authentic news of either VK2AJB or VK6GR? I am told that we can consider both these as lost, the former while serving with the R.A.F. and the latter with the R.A.N. Any news of them will be very welcome...so let us hope by the next issue I can give you all some better news for the loss of any VK, any Ham for that matter, always seems the loss of a personal friend, such is "the Ham Spirit."

So far, Vic Jarvis VK2JV is the only VK definitely known to be killed. Vic, serving from R.A.A.F.W.R. was lost in first Libyan campaign. Remember the "Nancy Leo and the laddie with the 'uke????..well one of our converted VK merchantmen would have called "CQ DX" when the ship went down, which, luckily, it didn't. The good ship started from VK with the hams represented by VK3IR, but by the time she had reached China VK4CJ and VK3UH had arrived to lend a hand. The shipper no doubt saw what three hams could do so no doubt that is why they went over to G to pick up DX Hound VK2KS, and from there on "efficiency" was the word from the Wireless Room. Naturally, Anzac traditions have to be upheld so they looked up every Ham organisation that they knew of in any Port touched. In England they had a big newspaper write-up and an invite to the BBC Dinner...guess the BBC are still after that "accent" Hi. Embolded by this is no doubt the reason that in K6 they called on the FCC and the 2nd RI took them everywhere in his car and to dinner at Waikiki Beach Hotel. They, too, will, as the Yanks now say...Remember Pearl Harbour, Hi. I believe they also called at Los Angeles, but alas for Ham Radio. They went to suburb of "Come up and See me Sometime" (Hollywood) and this time they let the A.I.F. down as they did "not" get a film contract. Certainly some of the boys are seeing their DX.

Basil Dale VK2XX/9XX was or is up at Moresby living a la native in a grass hut, which is much cooler than the RAAF tin variety. Basil touring has so far covered from New Guinea to Ultime to Laverton to Richmond to Laverton to Townsville and nearly back home again to Moresby. Thanks Basil for all the other news which has been referred to previously. Tobacco is very cheap up there...20 cigarettes for 8d. best brands. Beer 1/- a bottle...leaves me with a sour taste on 27th Dec. Hi!

I hear the W/O Frank Hine 2QL has been on yet another tour of VK per RAAF Recruiting Train. I did hear that some irate young women who thought they "had" learnt morse, nearly chucked him in the Swan after he had given a report on it. That is quite in order, but does Mrs. 2QL know about the dinner the WAAFs gave

him when he passed through Melbourne...I suppose both Mr. and Mrs. 2QL will be visiting 2YC in the very near future. H1.

VK 2PE is back from service with RAAF in the desert areas, but so far we have no real news from him. As mentioned before 2IP and 2VG are also back again. As 2IP was stationed at Khota where he could no doubt tell us a few things.

To those other RAAFWR chaps who are still in malaya 2HZ, 2VY, 2XK and the rest we can only wish them the best of luck... being a nice polite non-political column. H1. Will anyone hearing from any of them please send news to 2YC. ('phone AU1042) or FRQ.

By the way, should any of you want to write to 3UH or 2KS, the QRA is "R.A.N. Telegraphist"...(K.G. Allen or L. Myers) C/o Aust. Navy Drafting Office. R.N.S. Portsmouth, England.

As any chap overseas is glad to receive home mail, how about some of you chaps who have had QSOs with these two sending them a little home news.

Our English visiting hams seem to have disappeared into the blue, so possibly they are in some other State.

And that, as the best BBC announcers say, "brings us to the end of the News." Don't forget that we want more and more bits of information about the chaps from each State and particularly about those Overseas.

Happy and Victorious New Year, Oms. and many thanks 9XX, 3IR, 2QL and 2 HC.

--- 2YC.

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D I V I S I O N A L N O T E S

- Federal Headquarters -

As a result of a survey of Institute activities carried out recently by Federal Headquarters it was found that in the Eastern States VK2, VK3 and to a smaller degree VK4 were still carrying on as in pre-war days. In New South Wales and Victoria regular Monthly General Meetings are still being held with of course varying attendances. VK3 is still publishing the Magazine whilst New South Wales is Headquarters Division. In Queensland a skeleton organisation is maintained by a number of Members meeting at various shacks each month. In Western

Australia, General and Council Meetings were suspended on and after 1/6/40 and the Executive Officers at that date were to remain in Office. Secretary to call Council together should the occasion warrant. The Annual General Meeting and Dinner to be held each year.

Unfortunately in VK5 and VK7 the organisation had been allowed to lapse but as the result of recent correspondence offers have been received from Members of these Divisions to re-organise these States and it is confidently expected that within long these Divisions will again be active.

With recent developments in the Pacific it is difficult to see what effect the new Call-Up will have on the various Divisions, but F.H.Q. strongly advises that every endeavor be made to keep the Institute alive in every State as far as possible. In bombed and blitzed Britain the R.S.G.B. averages 100 new members a month. Never let it be said that the W.I.A. had to close down.

With reference to the Census of Commonwealth Experimenters, favorable replies were received from VK2, VK3 and VK4 whilst VK6 were a little dubious of the results that would be obtained. In view of these expressions of opinion F.H.Q. decided to go ahead in an endeavor to have all circulars posted before 10th December - date of increase in postage. This proved quite an undertaking, but with the co-operation of VK2 Divisional Council and Members, this task was achieved with the resultant saving of approximately £5 in postage. F.H.Q. expresses thanks to those members that gave able assistance.

In all 2018 circulars were sent out and at the time of writing, ten days after they were posted, over 350 cards have been returned which augurs well for the success of the Census. When complete, the information obtained from the Census will be astounding as to the number of hams that are on Service, and just what they are doing.

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NEW SOUTH WALES DIVISION

The usual monthly General Meeting of the Institute was held at Y.M.C.A. Buildings on 18th December at 8 p.m.

The recent upheaval in the Pacific and its possible effects upon the Division was discussed at some length, and it was decided that should permanent blackouts be enforced, General Meetings at night be abandoned, and that the business of the Division be carried on by the present Councillors. Should

circumstances warrant the Secretary to call a Meeting at a suitable time and place. It is to be remembered that General Meetings at night will only cease should a permanent blackout be ordered. In addition to the above decision, it was decided that should no blackout be ordered, the present Council to carry on for a further twelve months. Members who were not present should not imagine for one moment that the Division feels it necessary to suspend operations. Those steps were taken merely to ensure that the Institute will continue to function despite anything that certain individuals of obscure origin now resident in the land of the Setting Sun, may do.

A very interesting Lecture was delivered by the Treasurer, Bill McElroy VK2UV on "Interesting Developments in Amateur Radio." The Lecturer had devoted considerable time and thought to the subject and all present voted this talk the best for some time.

The Division has received Greetings from Members everywhere and one Member, Chris Cowan VK2FZ makes the following prophecy:- "In six months time, the Russians will be fighting on German soil; France will be fighting with us again at Germany's back door, and the Land of the Rising Sun will be the Land of the Setting Sun for all "Js" who dare threaten us. So in a years time you will be fondly polishing the mike and bottles again and calling CQ de VK2TI/2WI". Hores hoping.

The next Meeting of the Division, blackouts permitting, will be held at Y.M.C.A. Buildings on Thursday 15th. January 1942.

All the best for 1942

-- VK2TI.

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VICTORIAN DIVISION

Although the matter has not yet been discussed by Council, it seems likely, in view of the recent notification in the papers, that a permanent black-out would not be ordered for the time being, that the usual meeting nights will continue as usual. The next meeting will be on Tuesday 3rd of February.

3RX..is believed to be busy with ships and their cargo, even tho' he doesn't talk about it. Has an 1851 tube in his BC receiver and finds it hard to control without losing gain.

3DH..had a wordy argument with 3RX on paper from which we glean that he is still at AW. 'Tis rumoured that Ivor is training his blank discs to come home when lent, as bases are very, very hard to get.

3TE..tells me that his home constructed electric clock is still working, in spite of the Japs...

3IW..has been listening around the SW bands and hears nothing 'cept numerous news broadcasts... There's not even a Ham on the air.

3XC..now resides in ViM.. Hope to see you some more OM.

3RQ..made his first appearance for two and a half years.. has seen quite a bit of VK....Wears three stripes on air force blue.

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Meeting Night—First Tuesday in each month.

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VK2NG; R. SMITH, VK2AIU; R. MILLER.

The Division meets on the Third Thursday of each month at Y.M.C.A. Buildings, Pitt Street, Sydney, and an invitation is accorded to all Amateurs to be present.

H A M S !

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